ANNALS OF THE NEW YORK ACADEMY OF SCIENCES

Volume 540
November 28, 1988

ADVANCES IN NEUROIMMUNOLOGY[a]

Editor
CEDRIC S. RAINE

CONTENTS

Preface. *By* CEDRIC S. RAINE xxiii

Part I. Basic Immunology and Immune Regulation

The T-Cell Antigen Receptor: Structure and Mechanism of Activation. *By* LAWRENCE E. SAMELSON AND RICHARD D. KLAUSNER 1

Immunoregulation in Rapidly Progressive Multiple Sclerosis. *By* BARRY G. W. ARNASON, AVERTANO B. C. NORONHA, AND ANTHONY T. REDER 4

Autoimmunity in Demyelinating Diseases. *By* BYRON H. WAKSMAN 13

Autoimmunity in Neuromuscular Disease. *By* JOHN NEWSOM-DAVIS 25

Part II. Nervous System Differentiation

Expression of Neural Cell Adhesion Molecules in Normal and Pathologic Tissues. *By* ROBERT BRACKENBURY 39

Where do Different Neurons Come From? Identification and Immortalization of CNS Precursor Cells. *By* RON MCKAY 47

Astrocyte Diversity. *By* A. PROCHIANTZ AND M. MALLAT 52

Relevance for Neurobiology and Neurooncology of Antigens of Malignant Gliomas As Defined by Monoclonal Antibodies. *By* FOTIOS D. VRIONIS, CAROL J. WIKSTRAND, AND DARELL D. BIGNER 64

Diagnostic Markers in Human Neurooncology: A Progress Report. *By* LUCIEN J. RUBINSTEIN 78

[a]This volume is the result of a conference entitled Second International Congress of Neuroimmunology, which was held by the New York Academy of Sciences on September 8-11, 1987 in Philadelphia, Pennsylvania.

Paraneoplastic Autoimmunity. *By* ANDREAS J. STECK AND E. NARDELLI 91

Part III. Clinical Neuroimmunology

Immunology of Multiple Sclerosis. *By* HENRY F. MCFARLAND 99

Narcolepsy and HLA in the Japanese. *By* TAKEO JUJI, KAZUMASA MATSUKI, KATSUSHI TOKUNAGA, TOHRU NAOHARA, AND YUTAKA HONDA 106

Neurologic Complications of Collagen Vascular Diseases. *By* ROBERT P. LISAK, PATRICIA M. MOORE, ARNOLD I. LEVINSON, AND BURTON ZWEIMAN 115

Immune Mechanisms in Inflammatory Polyneuropathy. *By* H. P. HARTUNG, K. HEININGER, B. SCHÄFER, W. FIERZ, AND K. V. TOYKA 122

Infection of the Central Nervous System by Human Immunodeficiency Virus: Role of the Immune System in Pathogenesis. *By* RICHARD W. PRICE AND BRUCE BREW..... 162

Strategies for the Treatment of Myasthenia Gravis. *By* DANIEL B. DRACHMAN, KEVIN R. MCINTOSH, SHARI DE SILVA, RALPH W. KUNCL, AND CAROLYN KAHN 176

Part IV. Virus-Induced Disease and Autoimmunity

Autoimmune Demyelination in the Central Nervous System. *By* TAKESHI TABIRA 187

Autoimmune Reactions Against Myelin Basic Protein Induced by Corona and Measles Viruses. *By* VOLKER TER MEULEN 202

Virus-Induced Autoimmunity Through Molecular Mimicry. *By* ROBERT S. FUJINAMI 210

Immunobiology of Microglial Cells. *By* KARL FREI, CHRISTINE SIEPL, PETER GROSCURTH, STEFAN BODMER, AND ADRIANO FONTANA 218

Cell-Mediated Immunity in Virus Infections of the Central Nervous System. *By* PETER C. DOHERTY 228

Mechanisms of Virus-Induced Demyelination and Remyelination. *By* MOSES RODRIGUEZ 240

Workshop 1. Immunogenetics and Gene Regulation

Brain Transplantation in Genetic Analysis of Experimental Allergic Encephalomyelitis. *By* FRED D. LUBLIN, ROBERT L. KNOBLER, JOSEPH MARINI, AND DAN GOLDOWITZ 252

Molecular Identification of Regulatory DNA Sequences for Basal and Gamma-Interferon-Induced Expression of HLA DRα in Human Multiforme Glioblastoma Cell Lines. *By* P. BASTA, P. SHERMAN, AND J. TING 255

Generation of Antibodies to Gangliosides GM1 and GD1b: Genetic Control of Fine Antigenic Specificity. *By* HIROAKI ITO, ROBERT K. YU, AND NORMAN LATOV 258

Quantitation of IgG Subclasses in Cerebrospinal Fluid of Patients with Multiple Sclerosis. *By* P. D. MEHTA 261

Gene Activation During Experimental Allergic Encephalomyelitis: Cloning of New cDNAs. *By* HERMANN J. SCHLUESENER, KAI W. WUCHERPFENNIG, AND HOWARD L. WEINER 264

Associations of the Autoimmune Myasthenias with Genetic Markers in the Immunoglobulin Heavy Chain Region. *By* ANDY DEMAINE, NICK WILLCOX, KEN WELSH, AND JOHN NEWSOM-DAVIS 266

Determination of RFLPs Linked to Multiple Sclerosis Susceptibility. *By* VIVIAN H. COHN, DOTY SEARS, MARK HESS, RICHARD S. SPIELMAN, NORMAN ARNHEIM, AND LESLIE P. WEINER 269

Molecular Genotypes of the T-Cell Receptor Beta Chain in Families with Multiple Sclerosis. *By* T. A. CIULLA, M. A. ROBINSON, E. SEBOUN, T. H. DOOLITTLE, T. HAYASHI, T. J. KINDT, AND S. L. HAUSER 271

Antibody-Producing Cells in CSF and Peripheral Blood: A New Principle for Evaluation of B-Cell Response in Inflammatory Nervous System Diseases. *By* H. LINK, S. BAIG, T. OLSSON, AND A. ZACHAU 277

Bone Marrow Cells in Multiple Sclerosis: A Functional and Phenotypic Study. *By* S. KAM-HANSEN, S. FREDRIKSON, AND C. Z-LU 282

Intrathecal Antimeasles Immunity in 140 Patients with Multiple Sclerosis. *By* E. SCHULLER, E. RUZICKA, B. ALLINQUANT, P. LEBON, A. GOVAERTS, AND J. D. DEGOS 286

Autoantibodies in Serum and CSF of Patients with Multiple Sclerosis. *By* A. BLANCHER, P. MATSIOTA, B. GUILBERT, B. DOYON, M. CLANET, E. KOUVELAS, A. RASCOL, AND S. AVRAMEAS 290

Workshop 2. T-Cell and Immune System Product Localization in Target Tissue

B-Cell Compartment in the Thymus of Patients with Myasthenia Gravis and Control Subjects. *By* B. CHRISTENSSON, P. BIBERFELD, AND G. MATELL 293

Thymopoietin: A Marker of the Human Nicotinic Acetylcholine Receptor. *By* E. MOREL, B. VERNET-DER-GARABEDIAN, F. RAIMOND, T. K. AUDHYA, G. GOLDSTEIN, AND J. F. BACH... 298

Expression and Cellular Localization of Major Histocompatibility Complex Antigens in Active Multiple Sclerosis Lesions. *By* TATSUHIKO HAYASHI, JACK S. BURKS, AND STEPHEN L. HAUSER 301

Immunohistochemical Analysis of Suppressor-Inducer and Helper-Inducer T Cells in Multiple Sclerosis Brain Tissue. *By* RAYMOND A. SOBEL, DAVID A. HAFLER, EDUARDO E. CASTRO, CHIKAO MORIMOTO, AND HOWARD L. WEINER..... 306

Demonstration of α, β, and γ Interferon in Active Chronic Multiple Sclerosis Lesions. *By* U. TRAUGOTT AND P. LEBON... 309

Immunoglobulin G (IgG) Localization During Acute Autoimmune Demyelination. *By* G. R. WAYNE MOORE AND CEDRIC S. RAINE 312

Endothelial Cell Ia Increases Before Inflammatory Cell Infiltration in EAE Induced in Long-tailed Macaques. *By* LYNN M. ROSE, ROSEMARIE PETERSON, RAJ MEHRA, AND ELLSWORTH C. ALVORD, JR. 315

Occurrence of HLA-DR Reactive Microglia in Alzheimer's Disease. *By* P. L. MCGEER, S. ITAGAKI, H. TAGO, AND E. G. MCGEER 319

Interleukin-2 Blocks Oligodendrocyte Progenitor Proliferation. *By* ROBERT L. KNOBLER, RUSSELL P. SANETO, AMNON ALTMAN, HOWARD M. JOHNSON, AND JEAN DE VELLIS..... 324

Comparison of Indirect Immunofluorescence and Immunogold-Silver Staining on Cell Surface Antigens of PNS and CNS Cells. *By* CONSTANCE J. DIFIGLIA AND KAY L. FIELDS..... 327

Loss of Functional Suppression Is Linked to Decreases in Circulating Suppressor-Inducer (CD4+2H4+) T Cells in Multiple Sclerosis. *By* MICHEL CHOFFLON, HOWARD L. WEINER, AND DAVID A. HAFLER 330

A 70-Kd Polypeptide Secreted by Human Peripheral Blood Mononuclear Cells That Suppresses Proliferation of a Human Glioblastoma Cell Line. *By* TIMOTHY J. HEMESATH, DARREL TARASEWICZ, ALISON O'NEILL, JEFFREY R. GULCHER, AND KARI STEFANSSON 333

Workshop 3. Lymphocyte Lines and Disease

Response of Rat Encephalitogenic T Cells to Synthetic Peptides of Guinea Pig Myelin Basic Protein. *By* ARTHUR A. VANDENBARK, GEORGE HASHIM, AND HALINA OFFNER..... 337

Analysis of Helper T-Cell Specificity Involved in the Antibody Response to the Acetylcholine Receptor. *By* JOSEPH A. TAMI AND KEITH A. KROLICK 340

Experimental Allergic Encephalomyelitis Mediated by Murine Encephalitogenic T-Cell Lines Specific for Myelin Proteolipid Apoprotein. *By* JUN-ICHI SATOH, FUMIHIKO KOIKE, AND TAKESHI TABIRA 343

Fine Specificities of Myelin Basic Protein-Specific Human T-Cell Clones. *By* J. R. RICHERT, C. A. REUBEN-BURNSIDE, G. E. DEIBLER, AND M. W. KIES 345

Alterations in the Pattern of MHC Restriction of T Cells in Relapsing Murine Experimental Allergic Encephalomyelitis. *By* R. M. MCCARRON, R. FALLIS, AND D. E. MCFARLIN 349

Recognition of Intracellular Measles Virus Antigens by HLA Class II Restricted Measles Virus-Specific Cytotoxic T Lymphocytes. *By* STEVEN JACOBSON, RAFICK P. SEKALY, WILLIAM J. BELLINI, CONNIE L. JOHNSON, HENRY F. MCFARLAND, AND ERIC O. LONG 352

Blood and Thymic Lymphocyte Responses to Peptide Sequences of the Acetylcholine Receptor in Myasthenia Gravis. *By* G. HARCOURT, N. SOMMER, J. ROTHBARD, D. BEESON, N. WILLCOX, AND J. NEWSOM-DAVIS 354

T-Cell Clones Specific to Acetylcholine Receptor, Its Subunits, and Peptides. *By* YOSHITAKA FUJII AND JON LINDSTROM 357

Synergism in the Pathogenesis of EAE Induced by an MBP-Specific T-Cell Line and Monoclonal Antibodies to Galactocerebroside or a Myelin Oligodendroglial Glycoprotein. *By* W. FIERZ, K. HEININGER, B. SCHAEFER, K. V. TOYKA, C. LININGTON, AND H. LASSMANN 360

A Suppressor Cell Line That Prevents the Adoptive Transfer of EAE in Lewis Rats. *By* KAREN ELLERMAN AND STEVEN BROSTOFF 364

Isolation of Human Lymphocyte Cell Lines Reactive with Whole Human Myelin. *By* JAMES BURNS AND KIMBERLY LITTLEFIELD 367

Workshop 4. Antibodies and Complement in Autoimmunity

Voltage-Dependent CA^{2+} Channels in Small Cell Carcinomas Are Blocked by Autoantibodies from Patients with Lambert-Eaton Myasthenic Syndrome. *By* HENRY J. DE AIZPURUA, GUY E. GRIESMANN, EDWARD H. LAMBERT, AND VANDA A. LENNON 369

Complement Allotyping Explains MHC Associations in Multiple Sclerosis. *By* W. J. ZHANG, T. J. COBAIN, R. L. DAWKINS, G. GRIMSLEY, AND I. R. MACKAY 372

Myelin Vesicles As an *in Vitro* Model to Study Mechanisms of Myelin Damage by Immune Effectors. *By* PADMAVATHY VANGURI AND MOON L. SHIN 374

Serum Antibodies to Peripheral Nerve Antigens in Guillain-Barré Syndrome. *By* T. NEGISHI, T. YAMASHITA, K. NOMURA, T. HOSOKAWA, R. OHNO, K. HAMAGUCHI, AND K. YUEMURA... 376

Neuropathy and Monoclonal IgM M-Protein with Antibody Activity Against Gangliosides. *By* E. NARDELLI, A. J. STECK, M. SCHLUEP, K. FELGENHAUER, AND F. JERUSALEM..... 378

Mechanism of Arachidonic Acid Release by Terminal Complement Complexes from Rat Oligodendrocyte X C6 Glioma Cell Hybrids. *By* Y. SHIRAZI, F. A. MCMORRIS, AND M. L. SHIN .. 381

Clonal Restriction of Complement-Fixing Antineural Antibodies in the Guillain-Barré Syndrome. *By* BJÖRN RYBERG 384

Terminal Complement Complexes (SC5b-9) in Cerebrospinal Fluid in Autoimmune Nervous System Diseases. *By* M. E. SANDERS, E. L. ALEXANDER, C. L. KOSKI, M. L. SHIN, Y. SANO, M. M. FRANK, AND K. A. JOINER..... 387

Workshop 5. Neural Cell Markers in Health and Disease

Expression of Voltage-Gated Calcium Channels in Tumor Cell Lines of Neuroectodermal or Other Origin. *By* BETHAN LANG, NITA NAGVEKAR, JASVINDER GILL, ANGELA VINCENT, AND JOHN NEWSOM-DAVIS..... 389

Rat Astrocyte Proliferation by Human B-Cell Growth Factors. *By* ETTY N. BENVENISTE, JOSEPH L. BUTLER, DAVID A. GIBBS, ALICE CHEN, AND JOHN N. WHITAKER..... 392

EAE Serum Decreases CNPase Activity in Cultures of B104 Cells. *By* R. ELKIN, W. D. LYMAN, C. F. BROSNAN, AND M. B. BORNSTEIN 396

Antibody for Nerve Growth Factor Detected in Patients with Alzheimer's Disease. *By* BENJAMIN F. ROY, TREY SUNDERLAND, DENNIS L. MURPHY, AND JOHN M. MORIHISA 398

Cytotoxic Response of Cultured Tumor Infiltrating Lymphocytes to Autologous Human Glioblastoma Cells. *By* M. C. KUPPNER, M. F. HAMOU, AND N. DE TRIBOLET 401

Phospholipase A_2 Activity in Cultured Glial Cells: Correlation with Appearance of Myelin Markers and Effects of Steroid

Hormones. *By* T. BRENNER, S. YEDGAR, J. WEIDENFELD, AND O. ABRAMSKY 403

Cloning of cDNA for Two Large Polypeptides Found in Myelinating Oligodendrocytes. *By* JEFFREY R. GULCHER, LINDA S. MARTON, AND KARI STEFANSSON 405

Neuroleukin Secretion Is Highly Regulated in T Cells But Constitutive in C6 Glioma Cells. *By* GREGORY T. SPEAR AND MARK E. GURNEY 407

A Peanut Agglutinin Binding Glycoprotein in CNS Myelin and Oligodendrocytes. *By* DANIEL D. MIKOL, SARA SZUCHET, AND KARI STEFANSSON 409

Cells Proliferating *in Vitro* to Local Brain Injury Are Primarily of Hematic Origin and Differ from Those Associated with Anterograde Degeneration. *By* I. R. KATZ, L. IACOVITTI, AND D. J. REIS 413

Workshop 6. Glia-Neuron Interactions

Interactions of Astroglia-Derived Factors with Hippocampal Neurons. *By* H. P. MATTHIESSEN, C. SCHMALENBACH, AND H. W. MÜLLER 416

Changes in Astrocyte Extracellular Matrix with Differentiation and after Contact with Neurites. *By* MARCH D. ARD AND RICHARD P. BUNGE 420

Antisera to an Axolemma-Enriched Fraction Have Antiaxon and Antimyelin Effects *in Vitro*. *By* DENNIS N. BOURDETTE, FREDRICK J. SEIL, CHARLES K. MESHUL, JOHN W. BIGBEE, GEORGE H. DEVRIES, AND HARISH C. AGRAWAL 423

Substance P Stimulates Release of Arachidonic Acid Cyclooxgenation Products from Primary Culture Rat Astrocytes. *By* HANS-PETER HARTUNG, KURT HEININGER, BÄRBEL SCHÄFER, AND KLAUS V. TOYKA 427

Insulin-Like Growth Factor-I Stimulates Regeneration of Oligodendrocytes *in Vitro*. *By* ROBIN L. MOZELL AND F. ARTHUR MCMORRIS 430

Intracellular Messengers: Influence of Oligodendrocyte Substratum Adhesion. *By* TIMOTHY VARTANIAN, GLYN DAWSON, AND SARA SZUCHET 433

Glioblastoma-Cell-Derived T-Cell Suppressor Factor (G-TsF): Sequence Analysis and Biologic Mechanism of G-TsF. *By* C. SIEPL, S. BODMER, E. HOFER, M. WRANN, K. FREI, AND A. FONTANA 437

Workshop 7. Cross-Recognition Between Nervous and Immune System Antigen

Antineuronal Autoantibodies in Neurologic Paraneoplastic Syndromes. *By* NEIL E. ANDERSON AND JEROME B. POSNER .. 440

Antibodies to Sulfated Glucuronic Acid Containing Glycosphingolipids in Neuropathy Associated with Anti-Mag Antibodies and in Normal Individuals. *By* SCOTT MCGINNIS, TATSUO KOHRIYAMA, ROBERT K. YU, MICHAEL A. PESCE, AND NORMAN LATOV 442

Mammalian Reovirus Receptor Expression by Oligodendrocytes. *By* JEFFREY A. COHEN, ROBERT C. SERGOTT, HERBERT M. GELLER, MARK J. BROWN, AND MARK I. GREENE 445

Isolation and Characterization of *Borrelia Burgdorferi*-Specific and Autoreactive T-Cell Lines from the Cerebrospinal Fluid of Patients with Lyme Meningoradiculomyelitis. *By* ROLAND MARTIN, JOHANNES ORTLAUF, VERONIKA STICHT-GROH, AND HANS GEORG MERTENS 449

Monoclonal Antibodies Against the P2 Protein of Peripheral Myelin and d18 Protein of PC Cells Bind to Antigen-Presenting Cells and Inhibit T-Cell Activation. *By* DONARD S. DWYER, F. PIERRE VANDERVEGT, JOACHIM BARTELS, AND GEORGE B. BROWN..... 452

Expression of Leukocyte Antigens on an Oligodendroglial Cell Line. *By* LYNN M. ROSE, SUSANNE L. JACKEVICIUS, AND EDWARD A. CLARK 455

Characterization and *in Vitro* Use of a Monoclonal Anti-Idiotypic Antibody Against HNK-1. *By* M. SCHLUEP, N. PAGE, G. PERRUISSEAU, AND A. J. STECK 459

Lesion-Induced Changes of Astrocyte Morphology and Protein Expression in Rat Optic Nerve. *By* GUIDO STOLL AND HANS-WERNER MUELLER..... 461

Glia Cells as Immunoregulatory Elements: Up- and Down-Regulatory Activities of Astrocyte Clones. *By* DEMING SUN, RICHARD MEYERMANN, AND HARTMUT WEKERLE 463

Autoantibody Reactive Integral Membrane Antigens of Thymocytes and Brain. *By* A. NARENDRAN AND S. A. HOFFMAN 466

A Monoclonal Antibody with Anti-Lipomodulin Activity Reverses a β-Adrenergic Response. *By* NINA L. PAUL, CURTIS A. WILLIAMS, AND NICOLE SCHUPF 467

Antibody Cross-Reactivity Between Myelin Basic Protein and CD3 Antigen of T Cells: Implications for Autoimmunity. *By* W. WEBER, Z. JINGWU, J. BORST, AND W. BUURMAN..... 470

Expression of Class II Antigens on Peripheral Nerve Allografts. *By* L. T. Yu, W. F. Hickey, W. S. Silvers, D. LaRossa, and A. M. Rostami 472

Workshop 8. MHC Antigens on Nervous Tissue

Down-Regulation of Gamma-Interferon-Induced Class II Expression of Human Glioma Cells by Recombinant Beta-Interferon. *By* Jeymohan Joseph, Concetta D'Imperio, Robert L. Knobler, and Fred D. Lublin 475

Neurotransmitter Modulation of the Human Class II Gene DRα on Multiforme Glioblastoma Cell Lines: A Molecular Analysis. *By* J. Ting, P. Sherman, S. Yokota, T. Moore, and P. Basta 477

Functional Implications of Class I MHC Modulation in Neural Tissue. *By* Lois A. Lampson, James P. Whelan, and Gabriela Siegel 479

West Nile Virus Infection Modulates the Expression of Class I and Class II MHC Antigens on Astrocytes *in Vitro*. *By* Y. Liu, N. King, A. Kesson, R. V. Blanden, and A. Müllbacher.... 483

Measles Virus Infection Causes Expression of Class I and Class II MHC Antigens in Rat Brain. *By* T. Olsson, J. Maehlen, A. Löve, L. Klareskog, E. Norrby, and K. Kristensson..... 486

Tumor Necrosis Factor Induces Expression of MHC Class I Antigens on Mouse Astrocytes. *By* E. Lavi, A. Suzumura, D. M. Murasko, E. M. Murray, D. H. Silberberg, and S. R. Weiss..... 488

Characterization of B Cells and IA Expression in Sindbis Virus Encephalitis. *By* W. R. Tyor, T. R. Moench, and D. E. Griffin 491

MHC-Dependent Neural Allograft Rejection. *By* K. Rao, H. W. Kunz, T. J. Gill, III, and R. D. Lund..... 493

MHC Antigen Expression on Glial Cells. *By* Akio Suzumura and Donald H. Silberberg 495

Accessory Cell Competence of Human Glial Cells in Mitogenic Activation of Resting Peripheral T Cells. *By* N. Cashman, S. Boulet, L. Cragg, L. Bambridge, and J. Antel..... 498

Microglia Express MHC Class II in Normal and Demyelinating Human White Matter. *By* G. M. Hayes, M. N. Woodroofe, and M. L. Cuzner 501

Workshop 9. Monoclonal Antibodies in AChR Epitopes

Proliferative Responses to Acetylcholine Receptor Peptides in Myasthenia Gravis. *By* S. BERRIH-AKNIN, S. COHEN-KAMINSKY, D. NEUMANN, J. F. BACH, AND S. FUCHS 504

Responsiveness of Myasthenia Gravis Lymphocytes to Recombinant Interleukin-2. *By* S. COHEN-KAMINSKY, S. BERRIH-AKNIN, AND D. SAFAR 506

Monoclonal Antibodies as Probes for Acetylcholine Receptor Epitopes in Thymuses and Thymic Epithelial Tumors of Patients with Myasthenia Gravis and Nonmyasthenic Controls. *By* THOMAS KIRCHNER, SOCRATES TZARTOS, FLORIAN HOPPE, BERTHOLD SCHALKE, HARTMUT WEKERLE, AND HANS KONRAD MÜLLER-HERMELINK 508

Stimulation of Autoimmune Helper T Lymphocytes from Patients with Myasthenia Gravis with Synthetic Peptides of the Acetylcholine Receptor Alpha Subunit. *By* REINHARD HOHLFELD, KLAUS V. TOYKA, LUCINDA L. MINER, AND BIANCA M. CONTI-TRONCONI 511

MHC Association Between Antistriational Antibody-Negative Myasthenia Gravis in the Chinese. *By* W. GIN, B. R. HAWKINS, W. J. ZHANG, V. WONG, Y. L. YU, AND R. L. DAWKINS 513

Synthetic Peptide of Human Acetylcholine Receptor α-Subunit Sequence 125–147 (Methionine 144), a More Potent Autoantigen Than Its Norleucine 144 Analog. *By* VANDA A. LENNON, ZHONG-XIAN HUANG, DANIEL J. MCCORMICK, GUY E. GRIESMANN, NAOKI FUJII, AND EDWARD H. LAMBERT 516

Probing for the Main Immunogenic Region of the Human Acetylcholine Receptor. *By* H. ENG, H. JÖRNVALL, M. CARLQUIST, AND A. K. LEFVERT 520

In Vitro Blockade of Neuromuscular Transmission by Monoclonal Anti-Acetylcholine Receptor Antibodies. *By* RICARDO A. MASELLI, BRIAN JOW, DAVID P. RICHMAN, AND DEBORAH J. NELSON 523

Antibodies Against the Acetylcholine Receptor also in Nonmyasthenic Autoimmune Disease. *By* ANN-CHARLOTT SUNDEWALL AND ANN KARI LEFVERT 525

Standardization of Acetylcholine Receptor Antibody Measurement. *By* E. BONIFACIO, R. L. DAWKINS, M. S. GRIFFITHS, AND T. J. COBAIN 528

Workshop 10. Immunotherapy of Autoimmune Diseases

Specific Suppression of the Antibody Response to Acetylcholine Receptor *in Vitro* and *in Vivo* by Daunomycin-Acetylcholine Receptor Conjugates. *By* DIANE SHELTON, YOSHITAKA FUJII, WOLFGANG KNOGGE, AND JON LINDSTROM 530

Effect of Lymphoid Irradiation on Clinical Course, Lymphocyte Count, and T-Cell Subsets in Chronic Progressive Multiple Sclerosis. *By* S. D. COOK. C. DEVEREUX, R. TROIANO, C. ROHOWSKY-KOCHAN, G. ZITO, AND P. C. DOWLING 533

Cumulative Experience with High-Dose Intravenous Cyclophosphamide and ACTH Therapy in Chronic Progressive Multiple Sclerosis. *By* JONATHAN L. CARTER, DAVID M. DAWSON, DAVID A. HAFLER, ROBERT J. FALLIS, LYNN STAZZONE, JOHN ORAV, AND HOWARD L. WEINER..... 535

Suppressor Cell Regulation of Chronic Relapsing Experimental Allergic Encephalomyelitis. *By* RUTH H. WHITHAM, DENNIS N. BOURDETTE, HALINA OFFNER, CHARLES K. MESHUL, AND ARTHUR A. VANDENBARK..... 537

Attenuated T-Lymphocyte Lines As Vaccinating Agents Against Experimental Autoimmune Encephalomyelitis. *By* HALINA OFFNER, RICHARD JONES, AND ARTHUR A. VANDENBARK 540

Inhibition of Passive Allergic Encephalomyelitis by Sulfated Polysaccharides. *By* DAVID O. WILLENBORG AND CHRISTOPHER R. PARISH..... 543

Suppression of Experimental Allergic Neuritis by Cyclosporin A. *By* H. NAKAYASU, K. OTA, H. TANAKA, H. IRIE, AND K. TAKAHASHI..... 546

Low-dose Cyclosporin A Induces Relapsing Experimental Allergic Encephalomyelitis in the Lewis Rat. *By* CHRISTINE D. DIJKSTRA, C. J. A. DE GROOT, J. C. KOETSIER, I. MATTHAEI, C. H. POLMAN, AND T. SMINIA..... 549

Treatment of Experimental Allergic Myasthenia Gravis with a New Immunosuppressant: 15-Deoxyspergualin. *By* YASUNORI ISHIGAKI, TAKESHI SATO, SONG TONG-LIN, AND KYOZO HAYASHI 551

Therapeutic Immunoadsorption of Acetylcholine Receptor Antibodies in Myasthenia Gravis. *By* TAKESHI SATO, YASUNORI ISHIGAKI, TADATOSHI KOMIYA, AND HIROSHI TSUDA..... 554

Workshop 11. Monoclonal Antibody and Lymphokine Therapy

Anti-CD4 and Anti-CD2 Monoclonal Antibody Infusions in Subjects with Multiple Sclerosis: Immunosuppressive Effects and Human Antimouse Responses. *By* DAVID A. HAFLER AND HOWARD L. WEINER 557

Effects on Experimental Allergic Neuritis in Rats by *in Vivo* Treatment with Monoclonal Anti-T-Cell Antibodies. *By* T. OLSSON, K. STRIGÅRD, P. LARSSON, R. HOLMDAHL, AND L. KLARESKOG 560

Suppression of P2-T-Cell Line Mediated Experimental Autoimmune Neuritis by Interleukin-2 Receptor Blockade. *By* H. P. HARTUNG, B. SCHÄFER, T. DIAMANTSTEIN, W. FIERZ, K. HEININGER, AND K. V. TOYKA 563

Sindbis Virus Neutralization. *By* M. E. WESTARP, J. STANLEY, AND D. E. GRIFFIN 566

Tumor Necrosis Factor Mediates Myelin Damage in Organotypic Cultures of Nervous Tissue. *By* KRZYSZTOF SELMAJ AND CEDRIC S. RAINE 568

Recombinant Human Lymphokines Induce Changes in Visual Evoked Potentials in the Rabbit. *By* C. F. BROSNAN, K. SELMAJ, C. E. SCHROEDER, M. LITWAK, C. S. RAINE, AND J. C. AREZZO 571

Intracerebral Beta-Interferon in Brain Tumor Therapy: Monitoring Cerebral Function with Compressed Spectral Analysis. *By* ROBERT L. KNOBLER, FRED D. LUBLIN, LEOPOLD J. STRELETZ, MICHAEL ZIMMER, JEYMOHAN JOSEPH, CONCETTA D'IMPERIO, BRUCE NORTHRUP, GIANCARLO BAROLAT, AND STEPHEN G. MARCUS 573

Clonal Modulation of Experimental Allergic Encephalomyelitis by a Monoclonal Antibody Directed to the T-Cell Receptor. *By* E. HEBER-KATZ, M. OWHASHI, M. P. HAPP, F. BURNS, N. SHEN, AND X. LI 576

Inhibition of Experimental Allergic Encephalomyelitis by a New Anti-Inflammatory Compound — SK&F 86002. *By* M. J. DIMARTINO, C. E. WOLFF, G. K. CAMPBELL, JR., AND N. HANNA 578

Anti-CD4 Monoclonal Antibody Therapy of Experimental Allergic Encephalomyelitis in Longtailed Macaques. *By* LYNN M. ROSE, ELLSWORTH C. ALVORD, JR., SARKA HRUBY, SUSANNE L. JACKEVICIUS, ROSEMARIE PETERSEN, NOEL WARNER, AND EDWARD A. CLARK 581

Workshop 12. Clinical Immunogenetics

Blood Lymphocyte β-Adrenergic Receptors in Multiple Sclerosis. *By* BARRY G. W. ARNASON, MARGARET BROWN, RICARDO MASELLI, JOE KARASZEWSKI, AND ANTHONY REDER 585

ACTH Production by Human Mononuclear Cells. *By* ANTHONY T. REDER, SUSMITHA PINAMANENI, WILLIAM SMYKA, AND DANIEL NUTTER..... 589

Identification of Myelin Basic Protein-Specific Oligoclonal Bands in Multiple Sclerosis. *By* KEISUKE MORIMOTO, SHIN-ICHIRO IKEBE, AND TAKESHI SATO 592

Human T-Cell Response to Human and Heterologous Myelin Basic Proteins. *By* E. TOURNIER-LASSERVE, G. HASHIM, AND M. A. BACH 594

Changes in Immune Function in Relapsing Multiple Sclerosis Correlate with Disease Activity as Assessed by Magnetic Resonance Imaging. *By* J. OGER, M. O'GORMAN, E. WILLOUGHBY, D. LI, AND D. W. PATY 597

Immunodiagnosis and Immunotherapy in Autistic Children. *By* V. K. SINGH, H. H. FUDENBERG, D. EMERSON, AND M. COLEMAN 602

Long-Term Follow-up Study of Relapse in Symptoms and Reelevation of Acetylcholine Receptor Antibody Titers in Patients with Myasthenia Gravis. *By* TADATOSHI KOMIYA AND TAKESHI SATO..... 605

Lymphocyte Subsets after Stroke. *By* A. CZŁONKOWSKA, J. KORLAK, AND A. KUCZYŃSKA..... 608

Workshop 13. Neuroimmunology of AIDS and Slow Virus Infections

Human Immunodeficiency Virus gp120 and p24 Oligoclonal Antibody in Acquired Immunodeficiency Syndrome Cerebrospinal Fluid and Sera. *By* LUIGI M. E. GRIMALDI, RAYMOND P. ROOS, ADRIANO LAZZARIN, MARIO MORONI, JAMES M. CASEY, AND SUSHILKUMAR G. DEVARE..... 611

Intrathecal Synthesis of Anti-HIV Oligoclonal IgG in HIV-Seropositive Patients Having No Signs of HIV-Induced Neurologic Diseases. *By* P. GALLO, A. DE ROSSI, P. CADROBBI, E. FRANCAVILLA, L. CHIECO-BIANCHI, AND B. TAVOLATO 615

Intrathecal Immunity in 37 Patients Seropositive for Anti-HIV-1 Antibody. *By* J. REBOUL, E. SCHULLER, G. PIALOUX, M. A. REY, P. LEBON, AND F. BRUN-VEZINET 619

Cerebrospinal Fluid Changes in HIV-1 Infection. *By* MATS ANDERSSON, TOMAS BERGSTRÖM, CHRISTIAN BLOMSTRAND, SVANTE HERMODSSON, CHARLES HÅKANSSON, AND GUN-BRITT LÖWHAGEN 624

An AIDS Virus-Associated Antigen Localized in Human Fetal Brain. *By* W. D. LYMAN, Y. KRESS, W. K. RASHBAUM, T. A. CALVELLI, E. STEINHAUER, J. M. KASHKIN, C. E. HENDERSON, AND A. RUBINSTEIN 628

Pathogenesis of Human Immunodeficiency Virus (HIV)-Associated Brain Lesions: A Neuropathologic Evaluation. *By* HERBERT BUDKA 630

Host-Virus Interaction in Caprine Arthritis-Encephalitis. *By* M. C. ZINK AND O. NARAYAN 634

HTLV-I Myelitis: Isolation of Virus, Genomic Analysis, and Infection in Neural Cell Cultures. *By* T. SAIDA, K. SAIDA, M. FUNAUCHI, E. NISHIGUCHI, M. NAKAJIMA, S. MATSUDA, M. OHTA, K. OHTA, H. NISHITANI, AND M. HATANAKA 636

Sera from Patients with Multiple Sclerosis React with Human T-Cell Lymphotropic Virus-I GAG Proteins: Western Blotting and Solid-Phase Radioimmunoassay Analyses. *By* M. OHTA, T. SAIDA, K. OHTA, F. MORI, H. NISHITANI, R. FUJINO, AND M. IKEDA 639

Immune Effects of Intracerebral Infection with Mouse Hepatitis Virus. *By* Robert L. Knobler, George C. Brainard, Marielle Perreault, Concetta D'Imperio, Paula Phenix, and Fred D. Lublin 642

Impaired Measles-Specific Cytotoxic T-Cell Response in Subacute Sclerosing Panencephalitis. *By* SUHAYL DHIB-JALBUT, STEVEN JACOBSON, DALE E. MCFARLIN, AND HENRY F. MCFARLAND 645

Workshop 14. Molecular Mimicry and Virus-Induced Demyelination

Caprine Retroviral Encephalitis in Previously Infected and in Specific Pathogen-Free Goats. *By* G. C. JOHNSON, D. S. ADAMS, AND T. C. MCGUIRE 649

Sequence Comparison of a Highly Virulent and a Less Virulent Strain of Theiler's Virus. Amino Acid Differences on a Three-Dimensional Model Identify the Location of Possible Immunogenic Sites. *By* DANIEL C. PEVEAR, JOSEPH BORKOWSKI, MING LUO, AND HOWARD LIPTON 652

Herpes Simplex Virus Type 1 Induced Multifocal Demyelination of the Central Nervous System in Mice. *By* L. F. KASTRUKOFF, A. S. LAU, AND S. U. KIM 654

Enumeration and Distribution of T-Cell Subsets, Macrophages, and IgG Positive Cells in the CNS of SJL/J Mice Infected with Theiler's Virus. *By* MARK D. LINDSLEY, ROGER L. THIEMANN, AND MOSES RODRIGUEZ 657

Borna Disease. An Immunopathologic Response to Viral Infection in the CNS. *By* K. M. CARBONE, C. S. DUCHALA, AND O. NARAYAN 661

Coronavirus-JHM-Induced Demyelinating Encephalomyelitis in Rats. Analysis of the Intrathecal Immune Response. *By* R. DORRIES, S. SCHWENDER, H. WEGE, H. HARMS, R. WATANABE, AND V. TER MEULEN 663

Early Viral Proteins As Autoantigens. Evidence from JC Virus Large T Antigen. *By* G. L. STONER, C. F. RYSCHKEWITSCH, D. L. WALKER, D. SOFFER, D. G. BRAUN, H. K. HOCHKEPPEL, AND H. DEF. WEBSTER 665

Increases in the Immune Responses to Theiler's Murine Encephalomyelitis Virus after Neonatal Treatment with Anti-T-Cell Receptor Antibody. *By* MARY CRANE, STEPHEN MILLER, HOWARD LIPTON, AND BYUNG KIM 669

Semliki Forest Virus (A7[74]) Infection of Adult Mice Induces an Immune-Mediated Demyelinating Encephalomyelitis. *By* J. K. FAZAKERLEY, A. KHALILI-SHIRAZI, AND H. E. WEBB 672

Fine Specificity of T-Cell-Mediated Immune Responses of Susceptible and Resistant Strains in Theiler's Murine Encephalomyelitis Virus-Induced Demyelinating Disease. *By* STEPHEN D. MILLER, RICHARD J. CLATCH, AND HOWARD L. LIPTON 674

A Study of Persistent Viral Infections Using Nude Mice and a Temperature-Sensitive Mutant of Vesicular Stomatitis Virus. *By* SHARON C. DOLL AND TERRY C. JOHNSON 678

Workshop 15. Neuroimmunomodulation

Potentiation of Il-1-Induced BALB/3T3 Fibroblast Proliferation by Substance P. *By* EDWARD S. KIMBALL AND M. C. FISHER..... 681

Suppression of Anaphylactic Shock by Enkephalins. *By* DRAGAN MARIĆ AND BRANISLAV D. JANKOVIĆ..... 684

Neurokinin-Induced Generation of Interleukin-1 in a Macrophage Cell Line. *By* EDWARD S. KIMBALL, FRANCIS J. PERSICO, AND JEFFREY L. VAUGHT 688

Enkephalins Modulate *in Vivo* Immune Reactions Through Delta- and Mu-Opioid Receptors. *By* BRANISLAV D. JANKOVIĆ AND DRAGAN MARIĆ 691

Opioid Receptors on Murine Splenocytes. Possible Coupling to K^+ Channels. *By* D. J. J. Carr, J. K. Bubien, W. T. Woods, and J. E. Blalock 694

Somatotropin and Prolactin Enhance Respiratory Burst Activity of Macrophages. *By* Carl K. Edwards, III, Jeanette M. Schepper, Libby M. Yunger, and Keith W. Kelley 698

Effect of Sound Stress on the Migration of Prethymic Stem Cells. *By* Catherine E. Bomberger and Jack L. Haar 700

Interaction of Endogenous Opioids and Developing T Lymphocytes. *By* Delane Bailey, Leonor Gonzales, and Marie Metlay 702

Neuroendocrine Regulation of Immune Parameters. Photoperiod Control of the Spleen in Syrian Hamsters. *By* George C. Brainard, Marcia Watson-Whitmeyer, Robert L. Knobler, and Fred D. Lublin 704

Sympathectomy Augments the Severity of Experimental Allergic Encephalomyelitis in Rats. *By* Ewa Chelmicka-Schoff, Margaret Checinski, and Barry G. W. Arnason 707

Workshop 16. Autoimmune Models of Demyelination

Susceptibility of PLP-Induced EAE Is Regulated by Non-H-2 Genes. *By* Vincent K. Tuohy, Raymond A. Sobel, and Marjorie B. Lees 709

Oligodendrocyte Proliferation and Enhanced CNS Remyelination after Therapeutic Manipulation of Chronic Relapsing EAE. *By* C. S. Raine, R. Hintzen, U. Traugott, and G. R. W. Moore 712

Effects of $OX8^+$ Lymphocytes on *in Vitro* Lymphocyte Reactivity During Experimental Allergic Encephalomyelitis. *By* D. M. Essayan, J. A. Cohen, B. Zweiman, and R. P. Lisak 715

Evidence for an Immunosuppressive Autoantibody in Experimental Allergic Encephalomyelitis. *By* Iain A. M. MacPhee and Donald W. Mason 718

Changes in T-Cell Subsets in Experimental Allergic Neuritis. *By* T. Yamashita, T. Negishi, K. Nomura, T. Hosokawa, R. Ohno, and K. Hamaguchi 720

Presence and Distribution of Nervous System-Associated Mast Cells That May Modulate Experimental Autoimmune Encephalomyelitis. *By* Edward L. Orr 723

Role of Mast Cells in Peripheral Nervous System Demyelination. *By* David Johnson, Howard L. Weiner, and Pierrette A. Seeldrayers 727

Resistance to Induction of Experimental Allergic Encephalomyelitis. Role of Adjuvant Components and Antigen. *By* T. BRENNER, R. MIZRACHI, AND O. ABRAMSKY 729

Demyelination of the Peripheral Nervous System Causes Neurologic Signs in Myelin Basic Protein-Induced Experimental Allergic Encephalomyelitis. Implications for the Etiology of Multiple Sclerosis. *By* MICHAEL P. PENDER 732

Genetic Regulation of Susceptibility and Severity of Demyelination. *By* ROBERT L. KNOBLER, FRED D. LUBLIN, D. SCOTT LINTHICUM, MEL COHN, ROGER D. MELVOLD, HOWARD L. LIPTON, BENJAMIN A. TAYLOR, AND WESLEY G. BEAMER 735

Adoptive Transfer Experimental Autoimmune Encephalomyelitis. Evidence for Central Nerve and Spinal Root Dysfunction. *By* KURT HEININGER, WALTER FIERZ, BARBEL SCHAFER, HANS-PETER HARTUNG, AND KLAUS V. TOYKA 738

Index of Contributors 741

Major funding was provided by:

- NATIONAL INSTITUTE OF NEUROLOGICAL COMMUNICATIVE DISORDERS & STROKE/NIH
- SANDOZ PHARMACEUTICALS CORPORATION

Additional funding was provided by:

- ACCURATE CHEMICAL AND SCIENTIFIC CORPORATION
- AMERICAN CYANAMID COMPANY
- AMERSHAM CORPORATION
- BOEHRINGER-MANNHEIM PHARMACEUTICALS
- CIBA-GEIGY CORPORATION
- EASTMAN KODAK COMPANY
- HOFFMANN-LA ROCHE, INC.
- IMPERIAL CHEMICAL INDUSTRIES
- LILLY RESEARCH LABORATORIES
- MARCH OF DIMES BIRTH DEFECT FOUNDATION
- MONSANTO COMPANY
- NATIONAL MULTIPLE SCLEROSIS SOCIETY
- NATIONAL INSTITUTES OF HEALTH
- PFIZER PHARMACEUTICAL CORPORATION
- STUART PHARMACEUTICALS/DIVISION OF ICI AMERICAS
- THE UPJOHN COMPANY

The New York Academy of Sciences believes it has a responsibility to provide an open forum for discussion of scientific questions. The positions taken by the participants in the reported conferences are their own and not necessarily those of the Academy. The Academy has no intent to influence legislation by providing such forums.